Strategic Radiation Hardened (SRH) Electronics Council (SRHEC)

Matt Kay, OUSD STP&E

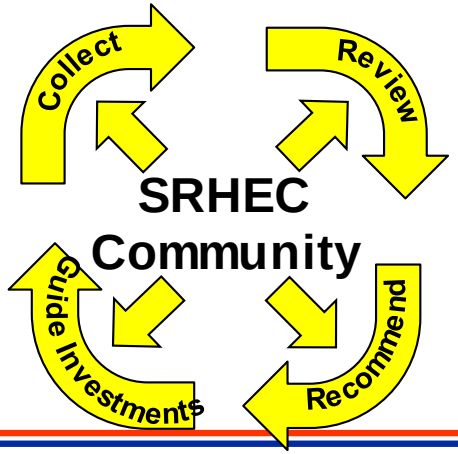
NASA Electronic Parts and Packaging Program Workshop
June 6-7, 2019
NASA Goddard Space Flight Center

SRHEC Purpose

- **To assess Strategic Radiation Hardened (SRH) electronic needs of the DoD and coordinate across the United States Government (USG) to create an overarching strategy for SRH electronics**

SRHEC Value Proposition

- **Facilitate collaboration across the Nuclear Enterprise to insure the availability of SRH electronics to meet existing and emerging program requirements**
- **Develop SRH technology roadmap based on:**
  - Program needs
  - Industrial base assessment
- **Establish SRH microelectronics library to facilitate re-use of government intellectual property (IP)**
- **Inform and coordinate Department of Defense (DoD) investments aligned with the SRH technology roadmap to mitigate overlap and duplication**
  - MINSEC, T&AM, DTRA, DARPA, IARPA, DPA Title III, and research labs
- **Coordinate SRH ecosystem to meet program needs**
  - Workforce development
  - Test facilities available to meet capacity needs
  - Acquisition policy changes



SRHEC Organization

EXTERNAL INTERACTIONS

- **NWC** Lead: DASD(NM)
- **NLCC** Lead: DoD CIO
- **CSOG-N** Lead: DASD(NM)
- **JFAC** Lead: DD, STP&E
- **AE COI** Lead: ARL
- **SIBWG** Lead: DASD(IND POL)
- **DoD T&AM / MINSEC** Lead: DD, STP&E

DASD(NM) Co-Chair

DD, STP&E Co-Chair

Executive Secretariat Lead: DD, STP&E

Technical Execution Lead Lead: NSWC Crane

SRHEC Working Groups

- **Program Needs** Lead(s): USN SSP; AFNWC
- **Technology and Development** Lead(s): MDA; NSWC Crane
- **Science and Technology Needs** Lead(s): NNSA; AFRL
- **Acquisition Activities** Lead(s): TBD
- **Test and Evaluation** Lead(s): CSOG-N; NSWC Crane
- **Trust, Assurance, Nuclear Surety** Lead(s): JFAC
- **Workforce Development** Lead(s): NASA; TBD

COUNCIL MEMBERS

NASA*
NNSA*
OCJCS
USSOCOM
USSTRATCOM/J8
DoD CIO
SAF/AQ
ASA(ALT)
ASN(RDA)
DTRA
MDA
NRO
DTRMC
ODASD(INDPOL)
ODASD(LOG)
ODASD(PWPM)
ODASD(SSI)
AF SMC
AF/A10
AFNWC
SMDC/ARSTRAT
AMRDEC
USN SSP
SPAWAR

*ex officio

SRHEC Working Group (WG) Priority Initiatives

- **Program Needs WG**
  - Coordinate with strategic/space programs to identify and quantify needs for radiation-hardened (RH) components and systems; identifying common needs, priorities, and leveraging opportunities
  - Coordinate with other WGs to propose roadmaps for research, test and evaluation, and delivery of essential RH capabilities to meet projected needs and provide options to address the unforeseen
  - Deliver, in coordination with other WGs, draft roadmaps that provide RH capabilities to meet identified needs by Fall Calendar Year 2019

SRHEC WG Priority Initiatives

- **Technology and Development WG**
  - Vendor surveillance and industrial base assessment
    - Conduct a periodic assessment of the health of existing vendor product lines, and develop roadmaps of SRH and space RH electronics development plans
    - Assess USG foundry access for RH parts, identify gaps, and provide recommendations for future investments for development and sustainment
    - Provide an industrial capabilities assessment in coordination with the Office of the Deputy Assistant Secretary of Defense (ODASD) Industrial Policy (INDPOL), the Defense Microelectronics Activity (DMEA), the Department of Energy (DOE), and other council members
    - Develop multiple options and provide recommendations for investments in foundries that support the needs of strategic and space/intelligence programs
      - DoD Microelectronics Innovation for National Security and Economic (MINSEC), DoD Trust and Assured Microelectronics (T&AM), Defense Threat Reduction Agency (DTRA), Defense Advanced Research Projects Agency (DARPA), Intelligence Advanced Research Projects Agency (IARPA), Defense Production Act (DPA) Title III, and research laboratories
  - Parts library
    - Provides ability to share data across programs as well as the ability to maintain desired confidentiality of program-specific data

SRHEC WG Priority Initiatives

- Foundry Access
  - Supported DPA Title III contracting effort to sustain Honeywell Plymouth, MN foundry; allowing for the lifting of their Last Time Buy notice
  - Guiding potential MINSEC investments in foundry capabilities to mitigate SRH Microelectronics (SRHM) gaps
- Radiation-Hardening By Design (RHBD) and Radiation-Hardening By Process (RHBP)
  - Development of RH leveraging RHBD, RHBP, advanced packaging, shielding, and die alteration approaches
- Parts Library
  - Naval Surface Warfare Center (NSWC) Crane developed a parts library that is nearing Authority To Operate in support of the Ground-Based Strategic Deterrent (GBSD) program that is extensible to use across the USG for other programs
    - Provides ability to share data across programs as well as the ability to maintain desired confidentiality of program-specific data

SRHEC WG Priority Initiatives

- **Test & Evaluation (T&E) WG**
  - Assess DoD programs requiring T&E of SRH electronics
  - Integrate program needs to create a "Strategic Radiation Test Infrastructure Modernization Roadmap," to include proposed capacity and capability improvements, in support of space and strategic RH electronics T&E
    - Coordinate roadmap with CSOG-N and T&E facility communities
- **Trust, Assurance, Nuclear Surety WG**
  - Sustain a robust trust and assurance program that is coordinated through the DoD T&AM Program, the JFAC, the AE CoI, SIBWG, and other USG agencies with SRH electronics
  - Engage industry in areas where trust, assurance, and reliability are a major concern; seeking common requirements, applicable standards, and processes
  - Build on existing USG trust and assurance policies to facilitate consistent, cost-effective implementation across USG strategic and space programs

SRHEC WG Priority Initiatives

- **Workforce Development WG**
  - Establish an enduring workforce development operating model that maintains critical capabilities and meets current and future mission needs
  - Leverage NASA capability leadership process to guide and inform SRH workforce development
  - Utilize technology development efforts to align and unify SRH workforce development throughout lifecycle

Contact Information

Matthew J. Kay, Ph. D.

OUSD(R&E)/STP&E

Phone: 812.854.1493

Cell: 812.227.1294

E-mail: matthew.kay@navy.mil

Discussion/ Questions

SRHEC Technical Execution Lead POC:

- **Matt Kay, NSWC Crane, 812-854-1876, jeffrey.johann@navy.mil**

SRHEC Background

- **DoD leadership and Congress are concerned about SRH industrial base**
  - DoD Trusted and Assured Microelectronics (T&AM), initiated in 2017 President's Budget, and Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) initially funded in 2018, tasked with developing a SRH microelectronics strategy
- **SRHEC formally established in September 2018**
  - Ensure continued availability, access and assurance of SRH electronics that are critical to the nation's security and defense
- **SRHEC Charter, September 9, 2018, co-signed and co-chaired by:**
  - Deputy Assistant Secretary of Defense for Nuclear Matters
  - Deputy Director, Strategic Technology Protection and Exploitation (DD, STP&E)
- **Naval Surface Warfare Center (NSWC) Crane serves as the Technical Execution Lead for the council**
  - NSWC Crane is the DoD T&AM/MINSEC program Strategic Rad-Hard Microelectronics (SRHM) Focus Area Technical Execution Lead
- **SRHEC Working Groups (WG) being stood-up on a priority basis**
  - Program Needs and Technology and Development WGs most active to date, e.g., industrial base assessment

Acronyms

- **AE COI:** Advanced Electronics Community of Interest
- **ASIC:** Application Specific Integrated Circuits
- **ATO:** Authority to Operate
- **CSEP:** Common Strategic Electronics Part
- **CSOG-N:** Chemical, Biological, Radiological and Nuclear (CBRN) Survivability Oversight Group - Nuclear
- **DARPA:** Defense Advanced Research Projects Agency
- **DASD:** Deputy Assistant Secretary of Defense
- **DMEA:** Defense Microelectronics Activity
- **DoD:** Department of Defense
- **DOE:** Department of Energy
- **DPA:** Defense Production Act
- **DTRA:** Defense Threat Reduction Agency
- **FPGA:** Field-Programmable Gate Array
- **GBSD:** Ground Based Strategic Deterrent
- **IARPA:** Intelligence Advanced Research Projects Agency
- **INDPOL:** Industrial Policy
- **IP:** Intellectual Property
- **ISSEP:** Intra/Inter-Service Strategic Parts
- **IV&V:** Independent Verification and Validation
- **JFAC:** Joint Federated Assurance Center
- **LTB:** Last Time Buy
- **MINSEC:** Microelectronics Innovation for National Security and Economic Competitiveness
- **MPW:** Multi-Project Wafer
- **NLCC:** National Leadership Command, Control, and Communications System
- **NM:** Nuclear Matters
- **NSWC:** Naval Surface Warfare Center
- **NWC:** Nuclear Weapons Council
- **OTA:** Other Transaction Authority / Agreement
- **PDK:** Process Design Kit
- **PrCB:** Printed Circuit Board
- **QPL:** Quality Parts Library
- **RH:** Radiation--Hardened
- **RHBD:** Radiation Hardening By-Design
- **RHBP:** Radiation Hardening By Process
- **SIBWG:** Space Industrial Base Working Group
- **SOI:** Silicon On Insulator
- **SOTA:** State-of-the-Art
- **SRH:** Strategic Radiation-Hardened
- **SRHM:** Strategic Radiation-Hardened Microelectronics
- **SRHEC:** Strategic Radiation-Hardened Electronics Council
- **STP&E:** Strategic Technology Protection and Exploitation
- **T&AM:** Trusted & Assured Microelectronics
- **T&E:** Test and Evaluation
- **USG:** United States Government
- **WG:** Working Group